REMARKS

Claims 1-12 are pending in the above-identified application.

In the Office Action dated February 10, 2009, the Examiner rejected claims 1-12.

With this Amendment, claim 11 was amended to corrected a typographical error. Accordingly, no new matter has been introduced as a result of the amendment.

I. 35 U.S.C. § 103 Obviousness Rejection of Claims

Claims 1-5 and 9-12 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Amey, Jr., et al. (U.S. Patent No. 6,409,567) in view of Debe (U.S. Patent No. 5,726,524). Applicant respectfully traverses this rejection.

The claims require a field electron emission film that is made of an ink that is coated and sintered on the cathode or electrode substrate such that the heat-decomposable metal compound is decomposed to a heat composition product. The heat decomposition product has adhesive properties imparted by the sintering. Specification, Page 9. As such, the field electron emission film is adhesive, dense and has less residual gas content. *Id.* The claims also require a surface roughness of 1500 nm or less. As evidenced by the data in Tables 1 and 2, the present invention requires a surface roughness that is smoother than conventional field electron films. Specification, Page 40 & Tables 1& 2.

The Examiner stated that product-by-process limitation in the claims is not afforded patentable weight. Specifically, the Examiner states that the sintering process cannot be afforded patentable weight absent a showing of unobvious difference between the claimed product and the prior art. Office Action, page 4. However, product-by-process claim limitations can be given patentable when the process steps impart distinctive structural characteristics to the final product. *In re Garnero,* 412 F.2d 276, 279 (CCPA 1979).

In this case, the sintering process decomposes the heat-decomposable metal compound thereby producing a heat decomposition product that has adhesive properties imparted by the sintering of the ink and the heat-decomposable metal dispersed therein. Accordingly, the product-by-process limitation should be given patentable weight because it imparts distinctive structural characteristics to the final product, namely a field electron emission film that used the heat decomposition product as an adhesive rather than adding resin, solder or inorganic adhesives as taught by the prior art. Specification, pages 5-9.

Amey Jr. et al. teaches a process for forming a field emission electron emitter that uses glass frit, such as a lead glass frit, as an adhesive. Amey Jr. et al. Col. 3, lines 10-15, col. 7, lines 14-19. Frits are a ceramic composition that has been fused, quenched to form a glass, and granulated. Accordingly, a frit that contains a metal compound such as lead is not the same as heat-decomposable metal compound as required by the claims. Furthermore, Amey Jr. et al. teaches a firing step during which time, "the organic materials are volatized leaving the layer of composite comprised of graphite particles and glass." Amey Jr. et al., Col. 7, lines 56-58. Accordingly Amey Jr. et al. teaches using glass adhesive, in the form of a glas frit, not a heat decomosition product of a metal compound as required by the claims. *Id.* at Col. 3, lines 10-15. Moreover, once the firing step is conducted as taught by Amey Jr. et al., only glass and graphite particles remain in the composite. As such, Amey Jr. et l. does not teach or even fairly suggest the same adhesive as required by the claims.

Debe teaches field emission device that includes an electrode having a layer of microstructures as electron emitters. Debe, Col. 1, lines 5-8. The microstructures are over-coated with at least one conformal coating, which can include crystalline and non crystalline materials.

Id. at Col. 3, line 66 - col. 4 line 25. Debe teaches that the surface morphology of the non-crystalline portions can be from .3 nm to 100 nm, however, Debe does not teach a surface roughness for the entire film, much less that the entire surface roughness of the film is 1500 nm or less as required by the claims. *Id.* at Col. 4, lines 21-25. As such, Debe does not teach or even fairly suggest the same surface roughness as required by the claims. As such, taken either singularly or in combination with each other, the cited references fail to teach or even fairly suggest all the requirements of the claims. Accordingly, Applicant respectfully requests that the above rejection be withdrawn.

Claim 6 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Amey, Jr., et al. (U.S. Patent No. 6,409,567) in view of Debe (U.S. Patent No. 5,726,524) as applied to claims 1, 10 and 11 and in further view of Saito (U.S. Publication No. 2002-0031465). Applicant respectfully traverses this rejection.

Saito teaches a method of making single-walled carbon nanotubes using carbon vapor and non-magnetic transition metals. Saito, Abstract. The Examiner suggests that Saito teaches, "said heat decomposition product is composed of a plurality of metals." Office Action, page 11. Applicant submits that the Examiner is incorrect. Saito teaches that a plurality of metals can be used as the non-magnetic transition metal, which when in contact with carbon vapor forms single-walled carbon nanotubes. Saito, Abstract & paragraph [0051]. As such, Saito does not teach or even fairly suggest a plurality of metals as a heat decomposition product, which functions as an adhesive as required by the claims. Rather, Saito teaches that a combination of non-magnetic transition metals when in contact with carbon vapor form single-walled carbon nanotubes, *not* heat decomposition products.

As discussed above, Amey Jr. et al. and Debe also fail to teach all the required elements of the claims. As such, taken either singularly or in combination with each other, the cited references fail to teach all the requirements of claim 6. Thus, claim 6 is patentable over the cited references. Accordingly, Applicant respectfully requests that the above rejection be withdrawn.

Claims 7-8 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Amey, Jr., et al, Debe, and Saito in further view Kajiwara et al. (U.S. Publication No. 2003-0102797). Applicant respectfully traverses this rejection.

Kajiwara et al. teaches the preparation of a Spindt-Type Field Emission Device where a metal compound solution that can include Sn and In is applied onto a cathode electrode in order to produce carbon nanotubes via the arc discharge method. Kajiwara, et al. paragraphs [0187, 0201] & Table 2. As such, Sn and In are used to form the carbon nanotubes themselves rather than the heat-decomposable metal compound, which is dispersed in an ink that also includes carbon nanotubes. As such, Kajiwara et al. does not, however, teach or even fairly suggest using a plurality of metals that includes Sn and In as a heat-decomposable metal compound as required by the claims.

As discussed above, Amey Jr. et al., Debe and Saito also fail to teach all the required elements of the claims. As such, taken either singularly or in combination with each other, the cited references fail to teach all the requirements of claims 7-8. Thus, claims 7-8 are patentable over the cited references. Accordingly, Applicant respectfully requests that the above rejection be withdrawn.

II. Conclusion

In view of the above amendments and remarks, Applicant submits that all claims are clearly allowable over the cited prior art, and respectfully requests early and favorable notification to that effect.

Respectfully submitted,

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